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THE AMERICAN HOROLOGIST

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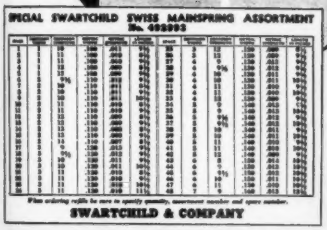
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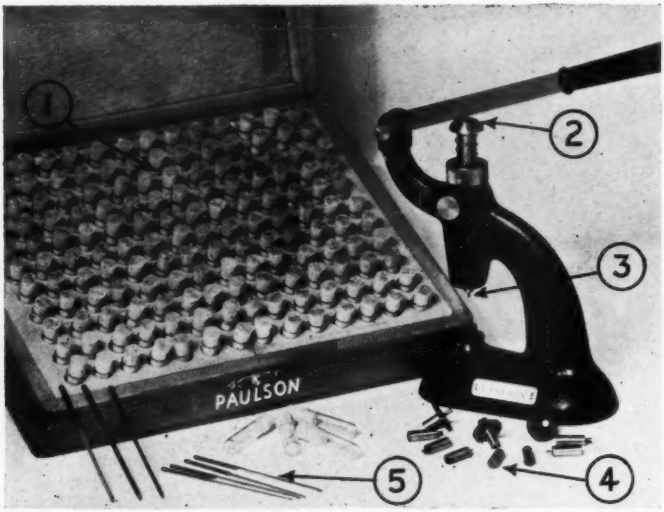

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Forward and Onward

REPORT BY W. H. SAMELIUS,
Technical Board Chairman, U. H. A. of A., 1936 Convention, Cincinnati, Ohio

MR. SAMELIUS: Gentlemen, I have no written report with me, but I can give you an idea of what we have done. That is in connection with the publication.

I don't like to take a hand in the real organization work. I am not in a position where I can do that very well, but I am in a position where I can help this organization in their technical work.

I am perfectly willing to devote my time that way any place where I can assist the watchmaker; help further his education or interest him so that he will further his education and for that reason I accepted the Chairmanship of the Technical Board.

What I have done in the last four months, since our publication came out was to get technical articles such as you have read and make up these drawings, these cuts that you have seen in the magazine. That is the work I have done.

I want to notify all of you if you have any articles of interest that you feel would be of benefit to the young watchmaker or bench man, send them in to us, we will be glad to have them. If you want me to revamp it, I will do so or will publish it as you send it in.

One man can't do this all alone. We must have help and as I say, you are all invited to take part. You may have an idea or two that is helpful in your work. If you have, send it in to us.

As I have said before, don't burn the bridges in back of you. Leave the bridge for the next man to cross. I know when I was a youngster at the trade, I was always looking for help or information and I was always looking for some bridge. The man ahead of me left those bridges and how nice it was when I came to the stream, there was a bridge for me to cross.

Why not let's all get together and help these men. I don't say they are helpless. They are all good watchmakers, but a lot of men are looking for more information in order to improve their knowledge and this is the only way we can pass it along.

During the past months that this publication has been issued, I have had many letters complimenting us on what we have accomplished and this association has set out and accomplished what other associations have been trying to do for the last fifteen years.

We are going places. I have attended many, many meetings and there is more pep, more interest and more doing right here today than in a lot of others. You are all here for a purpose. You are expressing yourselves, helping one another and advancing the Association and you have a say. That is more than I can say for some other meetings. I have attended meetings where they sat there and nothing was done and nobody had anything to say. But here you do have a say and that is one feature I admire about this Association because each member has something to say.

I see where you are giving members at large a say. I think that is wonderful. If those members at large, as our President said, have a vote, they will naturally form a Guild and if we can start these Guilds to growing we will have plenty of Guilds and large Guilds and interesting ones.

The slides Mr. Hagans has explained about. This meant a lot of work. I am willing to give up my time, all I can.

Those slides are to be used with lanterns and any of the Guilds that have a stereopticon lantern can have the use of these slides. If a man at the lecture platform does not know what to say about the slides and can't work up a lecture from them, there will be a written lecture for him to read and these meetings are worth any man's time at any time.

I want to see this organization keep on growing. It is a national one now, but let it be more national and in time, let's have our own building. Let's have own headquarters, maybe a school in which there will be a research department and an examination department. There is no telling what we can't have when our membership is strong enough and we are quite strong now.

I am tickled to death to see that there are a lot of members here that are enthused and that have taken up this organization work in a way that is going to lead it to something better and greater than anything we have ever had.

The watch making trade is the only trade that is not organized. The plumbers, the carpenters and bricklayers, all have national organizations and why not the watchmakers. By assisting the watchmaker, you will give him a more ethical way to carry on his trade, his business, and he will gain respect rather than be a joke. He will be respected and compared with the banker in his community.

You all know that the banker has always been first in the small town and the jeweler and watchmaker comes next. The townspeople will go to the banker with confidence and next he goes to the jeweler or watchmaker with confidence. We want to retain that confidence. We want to let them know and feel that we are responsible.

If we cannot prove it in any other way, we can by means of the plaque that we belong to an organization that receives no one but a responsible watchmaker, that they can trust with their work and know that they are going to get their work done in the proper form.

Now, I am getting off my subject. I want to invite all of you to send in any time any article that pertains to watchmaking, clockmaking, jewelry work, or anything pertaining to the store that will be beneficial to your fellow watchmakers. Have it published. Pass the good word along. I thank you.

Truing a Steel Scape Wheel That Is Out of Round

By S. P. Dayton

This is a little difficult on first thought, but is quite possible if one goes about it in a thoughtful, mechanical way, and is not at all impossible. Of course, we must assume in this case that the teeth and outer circle of the wheel are true and round and the trouble is that it is off center.

Let me make myself clear, and that is, before starting the job, give it careful consideration from every angle so as not to spoil it, which in the rush to turn out a lot of work has all to often been done. It is reasonable to assume that after removing it from the pinion it cannot be held in a wheel chuck and you cannot cement it on a cement chuck in the regular way so the next best thing to do is to turn out a seat in the cement brass just so the wheel will fit into it, and then a little cement will hold it there, and teeth will be running true. Now turn out the center just as little as is required to make it round and then make a bushing to fit the wheel and stake it on. Then turn back the seat of the pinion a little farther because the wheel bushing will be a little thicker than the center of the wheel. Now you can stake the wheel on and with a pair of calipers, true it in the flat and the job is a perfect one.

My reason for doing it that way is that the chances are that it is the right diameter and any attempt to cut down on the high side would not only be difficult, but would reduce the diameter, and cause a complete readjustment and would be the same as if you put a smaller scape wheel in the watch and then tried to make it work.

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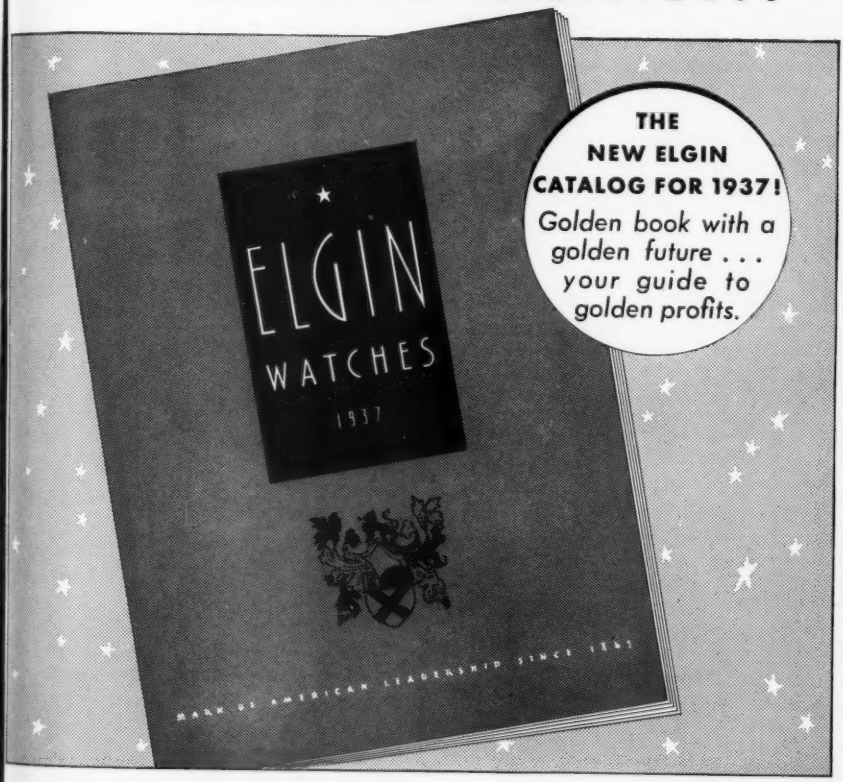

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The Motive Power—Dynamic and Static Poise

By Charles A. Braun
Illustrations by D. L. Thompson

THE motive power of a railroad watch must function properly in order to get a steady rate, therefore, it is important that you have a good mainspring. The thickness of spring specified by the Watch Factory for the particular model must be used, except in instances where an "Overbank" or lighter spring is required to prevent the watch from having excessive motion. Should a railroad watch require a heavier spring than standard to develop a normal motion it would jeopardize its performance, since too great a difference occurs in its motive power between the first and second half of its daily or twenty-four hour run; besides there is a limit of thickness to springs, to prevent either excessive breakage or setting. Any new mainspring put into the watch should be taken out of the barrel again after winding it a few times in the lathe, to see that it has not shrunk abnormally from its original diameter, to see that it still retains a normal geometrical spiral form, which proves its temper to be even. The winding of a mainspring in the lathe is done by chucking the arbor in a suitable chuck, having tension on the belt either from counter shaft, or motor and slowly winding and unwinding the mainspring while the barrel is held between fingers to note any abnormal actions such as jumping or binding.

D.L.T.

FIG. 1.

A graphical chart, Figure 2, of the performance of the mainspring may be made by attaching clamp, Figure 1, on the outer rim of the barrel and using either a reliable spring scale or unit of weight hung on the hook of the clamp to note its increase of power for every quarter turn, the lines up and down showing the increase in power and the other lines showing the arc of inflection or number of turns made by the arbor, the index of the lathe spindle offering a

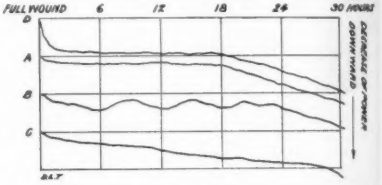

FIG. 2.

A. Path of normal spring.
B. Path of bumpy spring.
C. Path of set spring.
D. Path of normal spring without benefit of recoil click; dangerous for railway service; old models race when fully wound.

practical subdivision. One of the strong arguments against the use of old or reconditioned old watches for railway accuracy is the need of a stronger than normal spring to produce correct motion on account of excessive traction on train pivots and wheels and on the escape wheel and the condition of its jewels; a grind in the hold jewels of the balance resulting from action similar to the pitting of the cap jewels can be heard, but if these jewels are faulty in the train, it is often overlooked by the repair man. It is more subject to change of rate from the changes of viscosity of the oil than a normal new watch.

It will be often found that an old watch does not hold its rate with any safety, sudden changes from 10 to 20 seconds per week are possible and due to traction; the sharpness of the escape wheel club where it engages the resting surfaces of the pallet may be dulled and a watch with fresh oil may be perfectly regulated and run correctly for a period of a month or so, and then suddenly re-

(Continued on Page 25)

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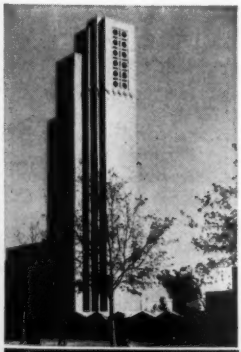

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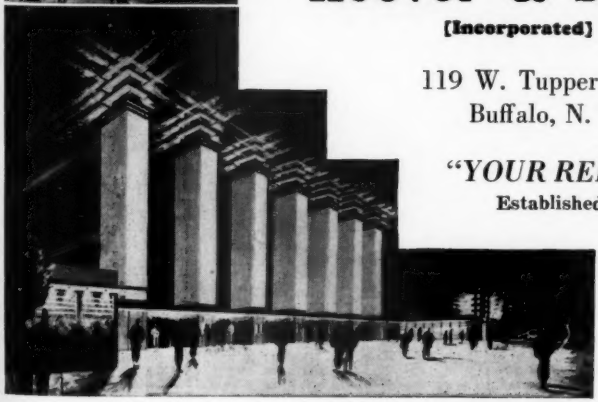

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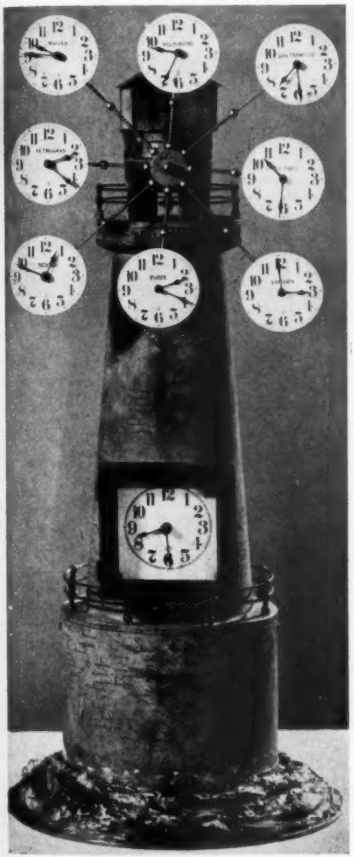
An Ingenious Windmill Clock

Drawing and Article by D. L. THOMPSON

A RATHER ingenious windmill clock has been given to the United Horological Association of America for exhibition purposes, by Jos. A. Schwarz, of Chicago, Ill. The maker



of this interesting mechanism is unknown.

The clock has a fixed dial showing the time at the place wherever it may be set up and eight revolving dials simulating the fan of a windmill. The moving dials show the time in eight of the world's largest cities simultaneously and assuming that the fixed dial is set for Central Standard Time then the moving dials are set to show the time in the various cities represented as follows:

New York, 1 hour faster; London, 5 hours and 53 minutes faster; Paris, 6 hours and 4 minutes faster; Berlin, 6 hours and 47 minutes faster; Petrograd, 7 hours and 3 minutes faster; Manila, 13 hours and 58 minutes faster; Melbourne, 15 hours and 34 minutes faster; San Francisco, 2 hours slower.

Fig. 1 is a view of this clock.

An eight-day clock movement is installed in the lower body of the mill house and the eight revolving dials are

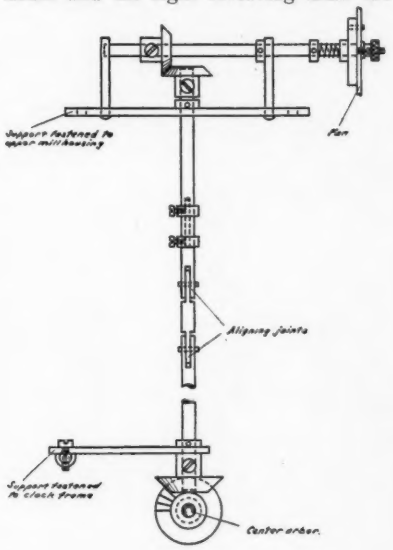


Fig. 2.

operated by shafting which is bevel geared to the center arbor of the clock.

Fig 2 shows the method of connecting the gearing to the center arbor and the manner of supporting the lower and upper ends of the vertical shaft. The gearing is even in ratio and communi-

cates exactly the revolutions of the center arbor to the horizontal shaft to which is attached the fan, holding the moving dials, which makes one revolution, therefore, per hour. The friction spring method is used at the point of attachment of the fan to the horizontal shaft so that the fan may be turned independently of the shaft in setting the fan dials in relation to the fixed dial.

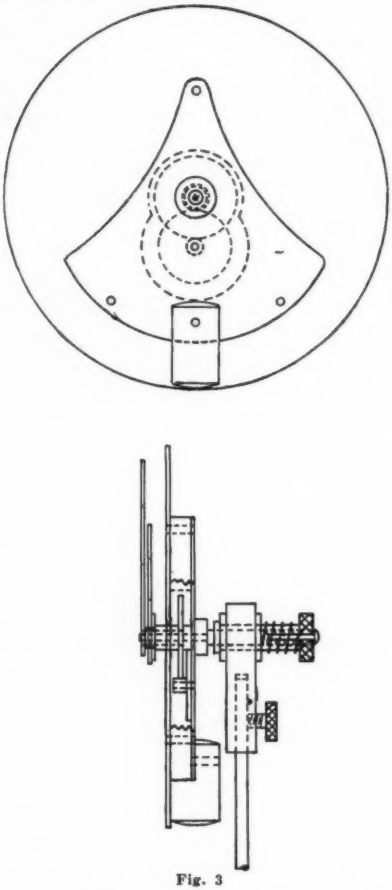


Fig. 3

Fig. 3 shows a back and a side view of one of the moving dials. An eighteen size cannon pinion, minute wheel and hour wheel assembly is used and it is enclosed in a triangular shaped case which is weighted at the bottom and fastened to the dial plate by rivets. The arbor for the cannon pinion and minute hand extends through the back of the case and passes through a square post and terminates in a setting knob which is spring frictioned against the post thus allowing the hands to be set by any predetermined time. The post is fastened to one of the radial wires of the fan by means of a set screw.

In operation the fan makes one revolution per hour and the minute hand on each dial will do the same. The cannon pinion, minute wheel and hour wheel assembly turns the hour hand 1/12 revolution, the weights on the bottoms of the dials always keeping them in an upright position due to the force of gravity. In this manner as the fan turns the eight dials show the time in the various cities represented which can be compared with Central Standard Time as shown on the fixed dial.

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In every case, you will notice by following the chart that the members collectively control all affairs of the Association. You will readily see that our work and progress is due largely to the support of our advertisers, and that we must reciprocate and urge others to deal with our benefactors. By so doing, expansion is made possible. This expansion will bring back our work before a greater number of progressive, ethical watchmakers and jewelers. Thereby, bringing about the desired results of unified progressiveness and betterment in the craft and industry.

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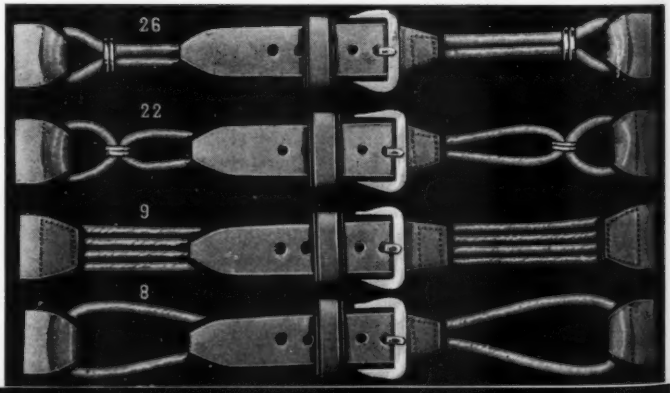

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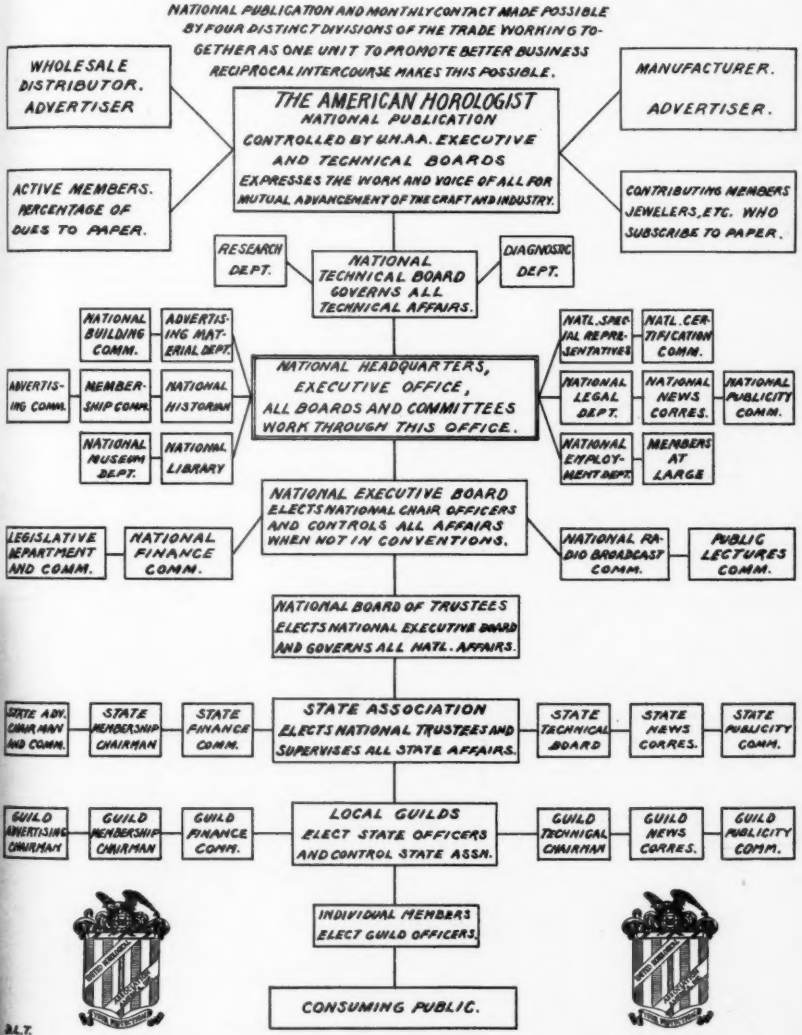
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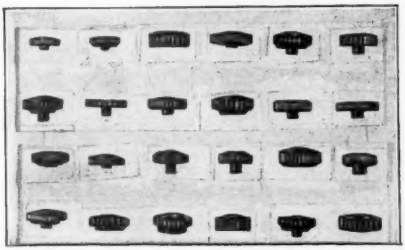

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Graphited Lubricants for Clocks

By BERNARD H. PORTER
Technical Department, Acheson Colloids Corporation

IN a previous article[1] on the subject of clock lubrication, we were able to suggest that the precision of mechanical movements might best be assured by the use of an adjunct lubricant like collodial graphite which material remains on friction parts as a dry lubricant long after oil carriers have dried. Since that time, interesting developments have been going on in England and abroad on this subject[2], with the result that a special blended graphite lubricant is now being introduced to British clock makers. In connection with this development some rather extensive tests on certain types of British movements have been carried out, the same being of interest, perhaps, to the clock industry in this country.

SPRING-DRIVEN ALARM

The first clock tested was a Smith spring-driven alarm of the "Robin" type. This had been running on ordinary clock oil for two to three years, and had given good service. It was dismantled, cleaned, and thoroughly examined; then reassembled and oiled with a blend of colloidal graphite and clock oil intended primarily for most general types of bearings except jewelled escapement holes.

No preliminary running was done to get the oil into the bearings and pivot holes, the clock being oiled when fully assembled. When wound, it started up on the third twist of the key, and, without its being further wound, its action was noted. The spring was allowed to run down as far as possible which was further than it had previously gone with ordinary oiling. Next, the clock was fully wound and remarkably brisk action ensued. Under normal conditions the balance had moved about one turn, but in this test it was soon running to a turn and a half and if the spring were wound tightly decided overbanking followed. This affect seemed to indicate that the graphited oil is suitable for the steel-to-steel conical bearings of alarm clock balances.

The action was good throughout the running of the clock, which was noticeably more silent in action. The spring was lubricated also, and wound smoothly. Timekeeping was slightly improved at the same time.

In the next test, the oil was removed and the alarm clock allowed to run as dry as possible. For this, it was taken down, wiped, but not immersed in gasoline, and then, with most of the oil removed, re-started. It ran well, the action being almost as good as when oiled with ordinary clock oil.

WHEEL-AND-PINION SYNCHRONOUS

Next, a synchronous Smith clock of the early wheel-and-pinion type, was tested. The same procedure of thorough cleaning and examination was followed. For the lubrication, a specially prepared colloidal-graphited lubricant was used, which proved equally as successful. The clock started up easily and ran quietly, while hand-setting was noticeably smoother. After two weeks' running the clocks were examined to see if the oil showed any tendency to spread away from the pivots or over the plates, but no action of this sort was found.

CAR CLOCK

A car clock was next tried, the same procedure carried out, and the general blend of colloidal graphite and clock oil used. The results were again good, despite the rather strenuous existence endured by a car clock. Timekeeping was better and, although the jewelled holes of the escapement were lubricated with ordinary oil, there was a decided improvement in action. This was maintained through cold nights when the car had been standing in the open for hours, and the test was carried further by leaving the clock itself out all through a

[1] "The Lubrication of Clock Mechanisms," American Horologist, April, 1936, page 12.
[2] British Clock Manufacturer, February, 1936.

cold night. Only slight falling-off of arc was noticed as the springs ran down.

WORM-DRIVEN SYNCHRONOUS

A worm-driven synchronous clock (a Temco) was next tested, and here again the movement seemed to function more smoothly than when ordinary oil was used, although with synchronous clocks such tests are difficult to check. No trouble was experienced with the distribution of oil in the bearings, an excellent film being distributed over the whole of the surfaces in contact.

The above tests would indicate that the colloidal-graphited clock oils insure efficient lubrication for clock mechanisms. Even though there are a great number of good clock oils on the market, not one seems to make use of those lubricating methods which represent scientific techniques in wider engineering practices. For example, the adjunct lubricant, colloidal graphite was first developed for large machinery and particularly for the field of automobile engineering. From these uses has sprung a variety of applications which make use of the intrinsic characteristics of colloidal graphite.

In view of graphite importance to the field of lubrication, it may be well to describe briefly its various characteristics and to point out its effect when combined with lubricants.

CONCERNING GRAPHITE

One need hardly say that graphite, the allotropic form of carbon, is a dark lustrous material. If one rubs it between the fingers, it gives a sensation of utter smoothness with the result that unctuous is perhaps the only word which describes adequately the feel of graphite. The reason for this unctuous property is to be found in the atomic structure of the material wherein the atoms are arranged at the corners of hexagons, and these hexagons, in turn, are so arranged in layers on top of one another that alternate, but not adjacent, layers lies symmetrically under one another (See Fig. 1). This results in a weakness of the atomic connection between one layer and the other. It is to this weakness in the ability of one layer of atoms to hold the adjacent one fixed firmly to it that graphite owes its quality of being a lubricant. Because of it, graphite can divide and subdivide itself into flat, hexagonal plates, which slide over one another with facility.

(Continued on Page 20)

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Electric-furnace graphite, a man made product, first produced by Acheson and manufactured from the purest forms of commercial carbon at the temperatures of the electric arc, can be processed to such an extreme state of fineness that the average size of individual particles may be in the order of 3/1,000,000 of

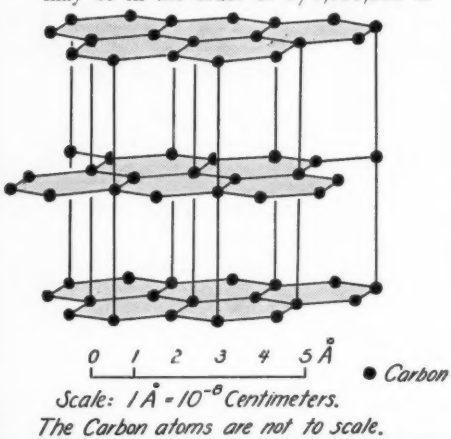

Fig. 1—Arrangement of carbon atoms in a graphite crystal deduced from X-ray diffraction experiments.

an inch. In this condition, graphite particles are so minute that when dispersed in liquids like mineral oil or water they remain in suspension indefinitely, pass through the pores of filter paper, and even rise with the carrier when the same is subject to capillarity. Some idea of the size of such particles can be realized when it is considered that 33 particles suspended one above the other are required to span a distance of 1/10,000 of an inch and that these particles will pass through the breathing tubes in the head of a mosquito, to form therein a photographing background.

Besides fineness, it also exhibits a somewhat remarkable phenomenon, shared with other colloids, called the Brownian movement. During the colloidalizing of the graphite, each particle receives an equal and similar electric charge in consequence of which the particles are continually repelling each other, thus causing them to vibrate in continuous movement and to effect more permanent suspension in liquid carriers.

It has already been pointed out that the planes in graphite particles slide one over another with little friction, the graphite thus being an excellent adjunct for lubricants inasmuch as it assists in friction reducing action. Moreover, the graphite will bond with the metallic bearings it lubricates. In fact, some of the tiny particles actually attach themselves to the metal in such a manner as to reduce the surface tension of the material. As oil flows more readily over surfaces having low surface tension, it follows that better lubrication is promoted. In addition, if the oil film in a bearing having a graphited or "graphoid" surface is broken down by over loading, the film will reform more readily than it would in ordinary circumstances. While if the oil protection completely breaks down, the same treated surfaces of the bearings prevent an actual metal-to-metal contact.

How efficient this protection is can be understood from a test made at the National Physical Laboratory. Two identical bearings were tested, one being lubricated with ordinary oil and the other with a colloidal graphite oil. The oil supply was cut off at a predetermined point, and the rotation of the bearings continued. The bearing previously lubricated with plain oil showed signs of seizure after 45 minutes running without any lubricating supply, but that which had been oiled with the lubricant containing colloidal graphite ran for 26 hours after the supply was stopped, and even then the symptoms of seizure developed much more gradually (See Fig. 2).

Other important characteristics of colloidal graphite, likewise verifiable by scientific test, include the following:

(1) The addition of colloidal graphite to an oil raises its seizing temperature 10° to 20° C. (18° to 36° F.).

(2) A graphited surface not only possesses the lubricating properties of the mineral carrier but also those intrinsic characteristics of

the graphite alone, thus permitting efficient dry lubrication for extended periods in the absence of oil.

(3) Graphited lubricants tend to resist the corrosive action of external conditions.

In view of the successful developments going on abroad in connection with graphited lubricants for clock mechanisms, it is time that a general survey of the above matter be made in the interests of the American clock industry.

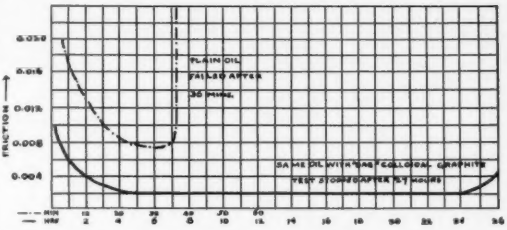

Fig. 2—Seizure Curve for Bearings Lubricated with Plain Oil and with Oil Containing Collodial Graphic.

Kansas City, Mo.

Ralph W. Fuhrman, for thirty years a jeweler, and until recently a partner in the Fuhrman Brothers, jewelers on Grand Ave., died at the age of 56 years, on Sunday, July 12th, at his home, 107 West 80th St.

R. W. Fuhrman

Mr. Fuhrman has been in ill health since the first of the year, and is survived by his widow, Mrs. Olga V. Fuhrman, a daughter, Mrs. A. W. Gilbert, and two sons, Herbert W. and Ralph E., all of this city; three sisters and two brothers.

The deceased was Vice-President of the Master Watchmakers' Association of Missouri, affiliated with the United Horological Association of America.

L & R Enlarges

The L & R Manufacturing Co. of Newark, N. J., producers of watchmakers' aids, have again found it necessary to expand.

To their factory, the L & R Manufacturing Co. has now added a new tool and die room. The demand during the past year for L & R Electric Watch Cleaning Machines has been so great that this addition was absolutely imperative to produce enough units to fill the incoming orders.

In addition to the L & R Junior and Deluxe Watch Cleaning Machines, they are now planning to produce the L & R Special. This machine will combine features of both machines and yet sell at an inbetween price. All these models are manufactured completely in their factory, and marketed by the leading distributors of watchmakers' tools and supplies throughout the United States and Canada.

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BRIDGEPORT AND NEW HAVEN, CONN.

Just State Facts—Don't Argue With Your Watch Repair Customer

BY FRED M. LUND

"How is my watch keeping time?" asked the customer as he handed it to the man behind the counter.

"It is running somewhat slow," replied the watchmaker. "How long ago was it set?"

"About a week ago," was the answer.

"Then I'll regulate it for you."

Upon examining the watch, it was evident that it needed repairing, and the watchmaker asked when it was last overhauled.

"Why, less than a year ago," said the customer, "And you were the last one to handle it."

The repair records showed, however, that it was exactly two and a half years since it had been gone over.

"Well," said the watch man, "I didn't think it was as long ago as that, either, but time certainly flies. I hope the watch hasn't suffered by running too long.

"I'd better leave it for cleaning," said the customer. "How much will it cost?"

"I'm afraid I can't tell you, exactly, until it is taken apart. You see, we don't speak of a watch repairing job in terms of cleaning, only; it must be overhauled."

The customer, not quite satisfied, insisted on knowing about what the cost would be, and was told that it would be six dollars, unless an examination showed injury or wear. In that case, an estimate would be sent. He was inclined to argue that the price was too high, but when the watchmaker quietly stated that, if anyone assumed to do the job for less, any price would be too high, he changed his attitude. "I believe you," he said, "Just go ahead and do the job, and never mind the estimate."

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SECURITY
THE PERFECT FITTING MAINSPRING
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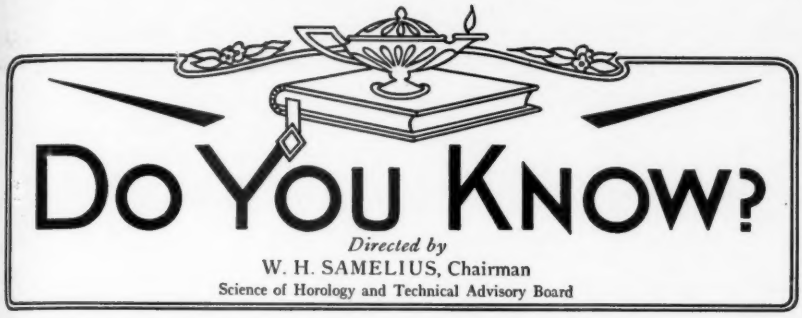

Directed by
W. H. SAMELIUS, Chairman
Science of Horology and Technical Advisory Board

The watch escapement is in beat when it takes the same amount of power to start the balance either to the right or the left.

One cubic inch of Gold weighs—
.6979 lb.
One cubic inch of Silver weighs—
.3805 lb.
One cubic inch of Steel weighs—
.2835 lb.
One cubic inch of Brass weighs—
.3029 lb.
One cubic inch of Lead weighs—
.41 lb.
One cubic inch of Mercury weighs—
.4909 lb.
One cubic inch of Cast Iron weighs—
.26 lb.
One cubic inch of Aluminum weighs—
.0924 lb.

Daylight saving time, a local system whereby timekeeping was advanced one hour ahead of the standard time of that locality. This is to give the workers an extra hour of daylight.

Your watch may be used as a compass by holding it so that the hour hand points to the sun, south then lies half way between the numeral 12 and the hour to which the hour hand indicates.

Eli Terry, is credited with making the first model for a short case clock. The case was about one foot square and five inches deep. The movement was made of wooden wheels and wooden plates. The train consisted of four wheels. It had a short pendulum of about 8 inches long, was weight driven with pulleys and cords so arranged that the weight could travel from the top to the bottom of the case, a fall of probably seven to eight inches. It was a one day clock and probably one of our earliest American made mantle clocks.

THE LABOR OF A WATCH

The average balance wheel vibrates or ticks:

5 times each second
300 times each minute
18,000 times each hour
432,000 times each day
157,680,000 times each year

Such a balance wheel travels between 1¼ to 1½ inches at each vibration. In one year's time this is equal to approximately 3733 miles or considerably more than the distance between New York and San Francisco.

Traveling by train, about thirteen freshly oiled and inspected locomotives would replace each other in a run of this distance. A motor car on this journey would require fresh oil every five hundred or one thousand miles—or seven times during the trip.

A watch, which operates continuously and runs the equivalent of this distance without rest or attention certainly deserves to be inspected and freshly oiled once a year. (Courtesy, Gruen Watch Co.)

Our earliest American alarm clocks were an attachment to the eight-day clock. The alarm dial was frictioned to the hour wheel tube and to this alarm dial, there was a cam with a deep cut for the locking lever to drop into, thereby releasing the alarm train at the hour indicated.

Connecticut Horological Association, New Haven Guild

The annual picnic will soon take place. We expect over 200 watchmakers to be present, and everything points to a most successful event. The committee is doing a wonderful job in making ready for our picnic.

New Haven Guild is starting their 1936 Advertising Campaign. All members have been supplied with generous quantities of one of the recent pamphlets created by the National Organization for publicity purposes. Further details will appear next month.

Our membership drive has been held up temporarily, due to the inactivity of the Membership Chairman, Bill Short, who recently got into the wrong pasture and is suffering from a case of poison ivy.

By A. R. RAPHAEL,
Publicity Chairman.

Horological Association of Pennsylvania, Pittsburgh Guild

At our last regular meeting held July 7th, about twenty members were in attendance, which is an extremely small number to be present. Lack of attendance was due to the extreme hot weather.

The Guild is planning another raffle to help finance the second annual exhibition at the Allegheny County Fair. There is a daily attendance at this Fair of about 75,000 people, lasting for a week, and it gives us a real opportunity to put our message across to the consuming public.

Our Guild is showing renewed interest, and with our ultra-fine Secretary, we now have, we will go places.

J. MANDEL,
News Correspondent.

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COUNT—6/0 size. Raised numerals on a silvered dial. Unbreakable crystal. Pigskin strap with gold-plated buckle. Retail, $5.95; Keystone list, $8.20.

COUNTESS—8/0 size. Oval, two-toned silvered dial. Unbreakable crystal. Pigskin strap with gold-plated buckle. Retail, $6.50; Keystone list, $8.90.

ALSO—not shown but of similar quality: DUKE at $6.50 retail, Keystone list $8.90; and DUCHESS at $7.50 retail, $10.20 Keystone list. At your jobber's. All prices slightly higher on Pacific Coast.

COUNTESS

$5.95 to $7.50
RETAIL

NEW HAVEN Timepieces

Watch Division
THE NEW HAVEN CLOCK CO. New Haven Conn.

THE MOTIVE POWER

(Continued from Page 8)

quire the moving of the regulator to offset a loss of 10 to 20 seconds per week. Illustrative of this condition are a number of older watches that you note the position of the regulator and then find that they gain so much after cleaning and oiling that you will have to move the regulator slower for almost 10 seconds a day or more, and eventually the regulator will have to come back again to where you found it when it was keeping good time and was due for cleaning, but the interim of time from the cleaning until a certain stability of the oil or any oil that you may use was established for the particular watch was a period of uncertain rate undesirable for the safety of Railway Service.

DYNAMIC AND STATIC POISE

The poising of a balance wheel is done by placing it upon a poising tool, and is considered in poise when it will stand at the four points of the circle and any agitation of the poising tool will not cause it to seek a lower level. This might well be called static poise. But as the balance moves at the rate of 300 times per minute other complex conditions enter into this problem.

Let us for sake of illustration, take a plain, three-armed Brass Balance wheel that is poised upon the poising tool and has been run in a watch say within a rate of 2 seconds in the vertical positions. Let us drill a hole in the edge of this balance wheel similar to the hole that you find drilled into a plain brass balance for a pin seen in the cylinder escapement; let us broach the hole so as to be larger on the outside edge and fill up again with platinum, and put it upon the poising tool; immediately the balance will swing around so that the platinum filled hole is at the bottom; now let us file away on the inner edge of the balance rim sufficient metal so that the balance again stands at all four of the points of the compass in static poise and you will find now that the watch instead of having a 2-seconds error total in the vertical position it now has 24 seconds a day and still it is in static poise on the poising tool. The previous example is cited to guard against the indiscriminate act of poising, attacking the heavy part just anywhere, like taking metal off the screw head or with a poising saw out of the screw slot when in reality, the point of weight removal should be at the tip of the screw end or at the base of the screw head or not at all. There is a difference between apparent true, and dead true in truing balances that might account for a small error of poise.

EXAMPLE NO. 2

Railroad watch having a close rate in positions breaks a balance staff; a new one is put in. Great care should at all times be exercised to find a new balance staff that fits the balance hole snugly to avoid the necessary forcible turning of the balance after riveting to find even length of the balance arms. The work progressed so nicely that it needed scarcely any truing, and the balance still had normal static poise, the watch was run in positions, and the following rate obtained:

CARD No. 1

DU	+2
DD	+2
PU	+2
PR	—4
PL	+2

CARD NO. 1

DU+2 DD+2 PU+2 PR—2 PL+4

This card showed what might be construed as an error of dynamic poise; in order to prove this contention the roller was reversed one-half way around on the axis of the balance staff and now the rate or Card No. 2 was taken and showed: DU+2 DD+2 PU+2 PR—4 PL+2 clearly proving this dynamic error.

Whatever method of procedure the workman may take to rectify this condition, such as moving a timing screw the infinitesimal amount for correction

that does not show up in static poise, or the collapsing of a screw in a polished

CARD No. 2

DU	+2
DD	+2
PU	+2
PR	+2
PL	—4

stake to make it two-thousandths shorter and have the same weight or the selecting of a hollowed out screw of same weight, it is absolutely necessary to have a record of the position of the various screws of the balance when it is at rest and with reference to the pendant position so as to intelligently determine what and how the change affected the rate and to be able to retract the method employed should it prove excessive in results.

CARD No. 3

DU	+10
DD	+10
PU	+1
PR	+1
PL	+1

CARD No. 3

DU+10 DD+10 Pendant up+1
Pend. R+1 Pend. left+1

Gain in the horizontal positions may be caused by excessive freedom in the hole jewels or pitted cap jewels or open regulator pins or loose regulator pins that sway with the hairspring.

Should the regulator pins clutch the hairspring so it would not readily slip out of the said pins, no close rate of timing can be obtained.

The patent regulator sometimes defeats its own purpose. Creeping Micrometer Screw, a stripped thread in a nut, and you will regulate and regulate, and get nowhere. This device should be carefully inspected. In the making of the position tests shown in Example II and in all position tests, it is of the highest importance that the watch be run the full 24 hours for its test because a good many watches do not show any variation until after the 18th hour. If the testing time must be abbreviated the mainspring must be let down to it 18 to 24-hour scope.

CARD No. 4 and 5
Telegrapher's Watch

DU	0
DD	0
PU	0
PR	—4
PL	+4

SAME WATCH WORN BY ENGINEER

First Test		Second Test	
DU	0	DU	0
DD	0	DD	0
PU	+4	PU	+6
PR	—2	PR	—4
PL	+6	PL	+4

EXAMPLE No. 4, CARD No. 5

The telegrapher's watch versus the engineer's watch.

The telegrapher's watch may run with a variation explained on Card No. 5: PU o Pend. right—4 Pendant left+4
DU o DD o
and its rate while hung up at the desk and its being slightly tipped while carried in the pocket might show a reasonably good rate, but the same watch carried on the engine would perhaps show a rate as high as 6 seconds a day off, or more, due to the greater amount of reduced arcs in balance motion, and therefore more subject to the dynamic disturbance.

Elgin Reproduces World-Famous Observatory at Texas Centennial—Attracts Huge Crowds

Jewelers invited to make headquarters in special lounge room

Follow the crowds at the Texas Centennial and you will probably find yourself squarely in front of the Elgin National Watch Company Exhibit. For this reproduction of the renowned Elgin Observatory, located in the Electrical Building, is proving itself one of the most popular features in the entire brilliant array of Centennial wonders.

Jewelers are being urged to make the Elgin Exhibit their headquarters during their stay at the Centennial. A special room has been fitted out exclusively for them. Here they may arrange to meet their friends, to lounge and rest and talk with other jewelers from all over the country.

Visitors who have gone through the original Observatory at Elgin are amazed at the fidelity with which it has been reproduced at the Centennial. Everything needed for the determination of "time from the stars" is here—except the stars themselves. And even these are faithfully represented by tiny electric lights twinkling through an aperture in the dome shaped roof. An astronomical telescope, an authentic Riefler Precision Clock, and a specially constructed chronograph have been set up as they are in the Observatory at Elgin. Onlookers see the observer train the telescope on a "star" . . . see the relative motion of the earth and the star translated into hundredths of a second (sideral time) and recorded on the chronograph . . . and see how the super-accurate Riefler Clock makes this time available twenty-four hours a day. To picture the Observatory as it looks from the outside, an exact scale diorama has been created and is to be seen in conjunction with the actual Observatory aquipment.

In addition to this replica of the Elgin Observatory, visitors will see a giant watch, just the right size for a man 60 feet tall! The mammoth movement is fully visible and ticks away the minutes in unison with a star-timed Elgin of normal size. A parade of antique timepiece models—all in motion—traces the development of the modern timekeeper from 1581 to the present day. And finally, in sharp contrast to these clumsy timepieces of our fathers, jewelers will see at the Elgin Exhibit the entire line of beautiful new 1937 Elgin timepieces.

Additional Technical Board Members

Out where the West almost begins in the great Northwest, two exceptionally brilliant and practical horologists have been chosen as members of our National Technical Board: Mr. Charles A. Braun and Mr. L. T. Christopherson.

Our Board Chairman, Mr. Samelius, is continually seeking the aid of talented men, who are willing to aid the betterment of all horologists.

With these last two appointments we are expecting much valuable bench experience to be transmitted to all through our publication.

Our work costs no more than ordinary work.

Incomparable Watch Case Repairing

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A Hand Chuck Holder of Many Uses

BY JES I. HANSEN
Illustrations by D. L. Thompson

Many times one wished to grind a perfectly flat and symmetrical surface on two or more sides of a rod of steel as in making drills, taps, punches, etc. A handy tool for this purpose is easily made that takes the place of the pin vise.

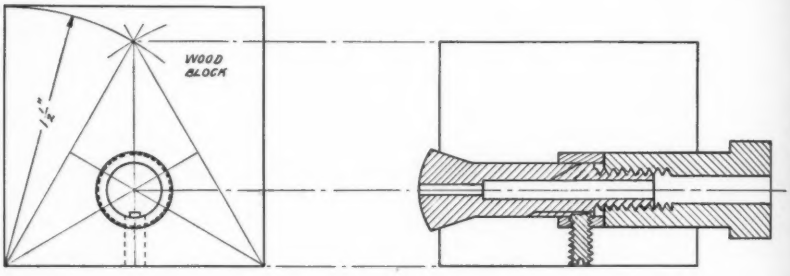

FIG. 1.

A block of maple, or other fine grain wood, 1½ inches square by 1½ inches long is marked as shown in Fig. 1, A to strike a center for drilling and for sawing to a triangular shape. A hole, a sliding fit for your lathe chuck, is drilled through as indicated in the figure. One end of this hole is then turned to the angle of the head of the chuck and just deep enough to expose the face of the chuck as in your lathe head. A drawing in spindle, similar to the dimensions shown in detail in Fig. 1, B, is made and tapped to fit your chuck. A collar of the same diameter of the spindle is made and a hole drilled and tapped for the screw holding it in place and forming a key for the slot in the chuck. Next enlarge the hole through the block at the end opposite the chuck face to fit the collar and drawing in spindle and of such a length as to place the key in position in the slot just slightly above the back shoulder of the chuck. The collar screw hole is now drilled and the screw put into place and filed to fit the slot. To finish the tool we now saw the block to the triangular shape as marked and file and sandpaper it smooth.

Fig. 1, B shows the sectional detail but the dimensions are not given as they will vary according to the chuck size and length for your make of lathe.

In use the chuck holder is held against the bed of the lathe, as shown in Fig. 2, at either front or back, as is necessary, to steady the work when holding it against the emery wheel thus obtaining a true, flat surface on opposite sides, as for drills, and on three sides, for taps. This tool also makes an excellent hand-vise and will find many uses.

This block could be made of brass or iron.

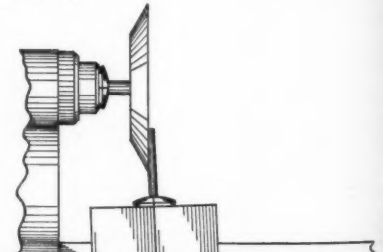

FIG. 2.

Denver Pawnbroker Underestimated Watchmaker's Ability As Many Others Have Done —and Do

Here is a little story, and it is a true one.

Charles Braun and myself took a stroll down to the Gette. You know, the place where the boys have the three balls on display. And in one of these places we discovered a very fine analtical scale in perfect condition, and, of course, we could both of us use it. The price $50.00, however, after some price heckling, we had that cut to $40.00, and I thought best to make the purchase, but my Fran said to wait. In the back of the store was a safe, a good one, so Charles said to the man that he could open it provided he would give him the first number. Well, that is the very thing that he would not tell the truth about so the bet was made the price of the scale and the $40.00 was laid on the line. Then the question was brought about the length of time. They would only give him ten minutes or the deal would be called off. However, we agreed and the master mind moved toward the safe. The pawnbrokers with watches in hand, and in two minutes the doors were ajar. My Fran turned to me and said, "The scale is yours." So that made me very happy, and the boys in the store very sad.

L. T. C., Active Member.

Cowlitz County Watchmakers' Guild, Affiliate No. 20

This recently organized and affiliated Guild in Washington, has taken unusual steps towards the betterment of their particular industry in their local section. This Guild has chosen for members only those watchmakers who conduct the highest type of ethical business. And in order to advance their craft, have published a magazine known as "Tick Tock," which is distributed among the customers of their members and through channels of distribution in their locality.

Their publication is supported through local advertisers of every type of business; is composed of news material pertaining to the interest of horology and jewelry, and in every instance they are promoting the national sign of recognition—our national plaque. It is reported that there first issue of "Tick Tock," which appeared in July, brought them far more results than they had anticipated. Such cooperative action is bound to aid all who desire cleaner business practices.

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By GEORGE T. GRUEN

The cannon pinion is placed on a small broach, and then pinched with a pair of pliers, or a staking tool punch. The notch is usually placed in the center of the cannon pinion, but the notching always depends upon the height of the taper on the center wheel. The notch must be placed so that it will rest just below the highest part of the taper on the center wheel.

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